

UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA, *et al.*

Plaintiffs,

v.

TYSON FOODS, INC., et al.

Defendants.

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Case No. 05-CV-0329 GKF-PJC

**DEFENDANTS' RESPONSE TO STATE OF OKLAHOMA'S MOTION IN LIMINE  
TO PRECLUDE EXPERT TESTIMONY OF DEFENDANTS' WITNESS BILLY CLAY, PH.D.  
DKT. 2061**

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The undersigned Defendants respectfully request that the Court deny the State of Oklahoma's Motion in Limine to Preclude Expert Testimony of Defendants' Witness Billy Clay Ph.D [Sic]<sup>1</sup>, Dkt. 2061. Plaintiff State of Oklahoma ("Plaintiff" or the "State") challenges Dr. Clay's qualifications to render his opinions and the reliability of the methods he employs. The State's Motion is based upon distortions of Dr. Clay's qualifications and the methodology underlying his opinions. Accordingly, the Court should deny the State's motion in limine in its entirety.

#### **I. THE COURT'S GATE-KEEPING FUNCTION**

The Court must determine whether Dr. Clay's proposed expert testimony is reliable, relevant, and will assist the jury. See, e.g., United States v. Nacchio, 555 F.3d 1234, 1241 (10th Cir. 2009) (citing, e.g., Fed. R. Evid. 702). First, the Court must determine whether Dr. Clay is "qualified 'by knowledge, skill, experience, training, or education' to render an opinion." See id. (quoting Fed. R. Evid. 702). Once the Court finds that Dr. Clay is sufficiently qualified, it must determine under the standards of Daubert whether his proposed opinions are "reliable by assessing the underlying reasoning and methodology." Id. (citations omitted). The Tenth Circuit instructs that the offering party must show that "the method employed" by Dr. Clay "is scientifically sound and that the opinion is based on facts which satisfy Rule 702's reliability requirements." Id. (internal quotations and citations omitted). "The focus, of course, must be solely on principles and methodology, not on the conclusions they generate." AG of Okla. v. Tyson Foods, Inc., \_\_\_ F.3d \_\_\_, 2009 U.S. App. LEXIS 10170, at \*22 (10th Cir. May 13,

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<sup>1</sup> Dr. Clay does not hold a Ph.D. He holds a Masters of Science degree in agronomy. He is a Doctor of Veterinary Medicine and is a Diplomate with the American Board of Veterinary Toxicology. (Ex. A: Expert Report of Billy R. Clay, MS, DVM, DABT, Nov. 29, 2008 at 35.) Plaintiff fails to attach a complete copy of Dr. Clay's report to their Motion.

2009) (quoting Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 595 (1993)).

“[W]hen experts employ established methods in their usual manner, a district court need not take issue under Daubert ....” Id. at \*24. Dr. Clay is qualified. His opinions are relevant and reliable and will assist the jury.

## **II. DR. CLAY’S KNOWLEDGE AND EXPERIENCE QUALIFIES HIM TO RENDER OPINIONS REGARDING ANIMAL PRODUCTION IN THE IRW.**

Dr. Clay’s expert opinions generally consist of providing the jury with a characterization of animal production in the IRW. (See generally Ex. A: Clay Report.) In particular, Dr. Clay provides opinions regarding the number of cattle and poultry in the IRW and the amount of manure they produce. (Id.) Although Plaintiff’s Motion repeatedly refers to Dr. Clay as simply a veterinarian (while failing to attach the portion of his Report listing his qualifications), Dr. Clay is uniquely qualified to present the opinions regarding animal production because of his life-long study of, and professional career in, the relevant inter-related disciplines of agronomy, veterinarian medicine and veterinary toxicology. Further, his reliance on Dr. Raleigh Jobes to calculate and interpret the statistical data in his report is reasonable because, among other things, Dr. Clay created and explained the methodology used by Dr. Jobes, and therefore, is adequately subject to cross-examined at trial. (Ex. B.2: Clay 3/25/09 Dep. at 359-69.)

An expert witness is qualified under Federal Rule of Evidence 702 when he possesses “such skill, experience or knowledge in that particular field as to make it appear that his opinion would rest on substantial foundation and would tend to aid the trier of fact in his search for the truth.” Graham v. Wyeth Labs., 906 F.2d 1399, 1408 (10<sup>th</sup> Cir. 1990). “[A] proposed expert ‘should not be required to satisfy an overly narrow

test of his own qualification.” CRST Van Expedited, Inc. v. J.B. Hunt Transport, Inc., 2006 WL 2054646 (W.D. Okla. July 24, 2006) (quoting Gardener v. General Motors Corp., 507 F.2d 525, 528 (10<sup>th</sup> Cir. 1974)). Rather, the standard for expert qualification is liberal with regard to both formal and substantive qualifications. See, e.g., In re Paoli R.R. Yard PCB Litig., 35 F.3d 717, 741 (3d Cir. 1994). A lack of specialization in a particular area of testimony does not affect the admissibility of the expert testimony but goes only to its weight. Compton v. Subaru of Am., Inc., 82 F.3d 1513, 1517-18 (10<sup>th</sup> Cir. 1996).

Dr. Clay’s skill, experience and knowledge are particularly appropriate to provide expert testimony about animal production in the IRW, the number of poultry, cattle and other animals in the IRW, and the characteristics of the manure these animals produce. (Ex. A at 35–39.) Dr. Clay’s entire life has been devoted to the study of the general principles that underlie the opinions in his expert report. In fact, he was born to and raised by a farming family in eastern Oklahoma. (Id. at 35.) He worked on farms and ranches for most of his early life, (Id. at 36), and he has personally raised poultry, swine and sheep. (Id. at 36.)

Beyond his practical experiences, Dr. Clay has achieved a Bachelor of Science and Master of Science in Agronomy from Oklahoma State University (“OSU”). (Id. at 35.) Agronomy, in general terms, is “the study of plant and soil sciences to crop production that incorporates the wise use of natural resources and conservation practices . . .” (Ex. C: American Society of Agronomy, About Agronomy: The Science of Agronomy, <http://www.agronomy.org/about-agronomy>.) “Soil management aspects of agronomy encompass soil fertility, land use, environmental preservation, and non-

production uses of soil resources for building, waste disposal, and recreation.

Agronomists who work as soil scientists play extremely important roles in helping preserve water quality and preserve natural environments.” (Ex. D: Food and Culture Encyclopedia, Agronomy, <http://answers.com/topic/agronomy>.) A simple perusal of the American Society of Agronomy reveals that this discipline focuses upon animal waste and its interaction with plants and soils. (Ex. E: American Society of Agronomy, Press Release, Manure Management Reduces Levels of Antibiotics and Antibiotic Genes, <http://agronomy.org/news-media/releases/20071126/110>.) In addition to his work as an agronomist, Dr. Clay also was also conferred a doctorate in veterinary medicine from OSU and was designated a Diplomate by the American Board of Veterinary Toxicology. (Ex. A: Report at 35.)

Dr. Clay not only studied the inter-related disciplines of agronomy (including animal waste), veterinarian medicine and toxicology, he has also taught agronomic principles, including the laboratory section of a course pertaining to forage crops and pastures for livestock as well as teaching the agronomic principles related to the food animal veterinarian and toxicology for veterinarians. (Id. at 36.) He also studied and taught various subjects involving the forage crops and pasture management, creating pasture for year-round consumption by livestock, and fertilization. (Id. at 35.)

For the past forty plus years, Dr. Clay has served as an expert consultant in environmental and agronomic issues. (Id. at 36.) One of his specialties is in agricultural production with a focus on animal health, animal/plant interactions with an emphasis on water quality. (Id. at 36.) Dr. Clay has published articles relating to these subjects in

peer reviewed journals, trade journals and other publications.<sup>2</sup> (Ex. F: Clay Aff. 6/5/09 at ¶¶ 2 & 3.) In addition, he has made many presentations at conferences and meetings of regional, state and national animal scientists and associations, and livestock association meetings. (Id. at ¶ 4). As an expert consultant, Dr. Clay has participated in studies involving the analysis of dry weight of beef and poultry manure as well as the major nutrients in beef and poultry manure. (Ex. B.1: Clay Dep. 3/25/09 at 88:5–89:7.) Although not academically peer reviewed, the results of this work were reviewed and accepted by the Food & Drug Administration for real world use. (Id.; Ex. F: Clay Aff. at ¶ 5.) Judge Eagan accepted Dr. Clay's expertise when she heard his testimony during the Daubert hearings in the City of Tulsa case. See Dkt. No. 423, 3/3/03 Minute Sheet and Dkt. No. 425, 3/10/03 Order at 2-3, City of Tulsa v. Tyson, et al., No. 01-CV-0900-EA (C).

Throughout his professional career, Dr. Clay has served in positions that have given him the background and experience to give expert testimony on animal production in the IRW in this case. He was elected to the Environmental Committee on the Council on Public Health and Regulatory Veterinary Medicine in the American Veterinary Medicine Association. (Ex. A: Report at 37.) He is a member of the American Society of Agronomy and the Council for Agricultural Science and Technology. (Id. at 38.) He has held several positions, including the office of President, in the Oklahoma Veterinary Medical Association. (Id. at 38. Dr. Clay also served as the AVMA representative to the OIE – World Health Organization for Animals. (Id. at 37.)

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<sup>2</sup> These publications and presentations are generally referred to in Dr. Clay's CV attached to his Report. (Ex. A: Report at 35, 36 and 39.) The publications were not specifically listed in Clay's Report because they were authored ten years before he authored the Report. (Ex. F: Clay Aff. at ¶ 3.) See Fed. R. Civ. P. 26(a)(2)(B).



Plaintiff's highly selective discussion of Dr. Clay's education, background and experience mischaracterizes and unfairly minimizes Dr. Clay's expertise in the issues in this case. Plaintiff alleges, without support, that only agricultural engineers have sufficient knowledge of animal waste characteristics, pointing to two documents relied on by Dr. Clay. Plaintiff's Motion, Dkt. 2061 at 10. Neither of the cited documents purports to make such a claim. Dkt. 2061 at 10 (citing Agricultural Waste Management Field Handbook, Ch. 4, USDA, Soil Conservation Service and American Society of Agricultural and Biological Engineers Standards for Manure Production and Characteristics.) Although absurd on its face, Plaintiff's claim of the inadequacy of Dr. Clay's qualifications also ignores the scope of Dr. Clay's expert opinions. Unlike an agricultural engineer, such as Plaintiff's consultant, Dr. Engel, Dr. Clays' background and experience allow him to provide expert testimony regarding bacterial relationships and the plant-animal-soil interactions. (See generally Ex. A: Report at 35-38.)

Dr. Clay's report provides estimates of the number of beef cattle, dairy cattle, other cattle and calves, broilers, turkeys, breeders/layers, hogs and pigs, other hogs and pigs, sheep, horses and ponies, white-tail deer, wild turkeys, geese, and ducks in the watershed. (Id. Appendix A, Table A-A.) Dr. Clay uses those inventories to determine the amount of wet manure these animals produce, the dry manure/litter produced, and the manure/litter available for application or deposit. (Id. 12-15.) In comparing different types of animals, Dr. Clay observed the time these animals were present in the watershed and their activities while in the watershed. (Id. at 8-12.) To obtain reliable inventory of animals present in the watershed, he drew on his unique skills, training and knowledge concerning the growing cycles for these animals, feeding practices, and replacement

practices. Dr. Clay's testimony will assist the jury in understanding the different types of practices of cattle, swine and poultry producers, and in particular how these practices affect the amount of manure in the watershed and ultimately what happens to that manure.

Finally, the State tries to taint Dr. Clay's expertise and opinions by mis-citing and mischaracterizing his opinions, testimony and ability throughout their brief. For example:

1. Plaintiff claims that "[a]nother area in which Dr. Clay reaches beyond his expertise is when he opines that the State has not produced evidence that 'cattle producers in the IRW have violated the laws and regulations pertaining to the applications of poultry litter,' while he also admits that he has not thoroughly investigated the truth of that statement." Dkt. 2061 at 3. In support of this statement, Plaintiff cites only Dr. Clay's summary of his opinion in the introductory sections of his report. Plaintiff makes no reference to Dr. Clay's more complete discussion of "Poultry Litter Utilization in the IRW" in the main body of the report. (Ex. A: Report at 16–19.)

In his deposition, Dr. Clay made no admission, as Plaintiff alleges, that "he has not thoroughly investigated the truth of that statement." Rather, Dr. Clay states that he did not review records from Oklahoma Department of Agriculture, Food, and Forestry ("ODAFF"). Plaintiff's deposition citations say nothing more. What Plaintiff omits is to explain why a review of ODAFF records would even be necessary to make a "thorough investigation." Unless all cattle producers are also certified poultry litter applicators or poultry producers in Oklahoma, then such a review would be incomplete. (Ex. A: Report at 27, ## 46–48.) See also Oklahoma Registered Poultry Feeding Operations Act,

OKLA. STAT. tit. 2, §§ 10–9.1 et seq.; Oklahoma Poultry Waste Applicators Certification Act, OKLA. STAT. tit. 2, §§ 10–9.16.

2. Plaintiff claims that “[s]imply put, Dr. Clay’s methodology was dependent on the total number of birds, yet he failed to use a reliable method for determining the correct numbers.” Dkt. 2061 at 5. To support this allegation, Plaintiff cites only one question and answer taken out of context from Dr. Clay’s deposition:

Q. And how many average poultry are in a house or a flock?

A. Well, I didn’t do it that way. I just took the total poultry to make the calculations.

(Ex. B.2: Clay Dep. at 361:24–362:2.) This argument is inserted in the section of Plaintiff’s motion addressing Dr. Clay’s inventory numbers. Dkt. 2061, 3– 5, “Dr. Clay’s Unreliable Poultry and Cattle Numbers.” However, this deposition testimony relates solely to Dr. Clay’s separate analysis of total litter produced.

(Ex. B.2: Clay Dep. at 361:11–362:19.) Dr. Clay explained that his analysis was not based on the average number of birds per poultry house rather the total number of poultry. (*Id.* at 361: 19–22.) Plaintiff’s challenge that Dr. Clay’s methodology to obtain a poultry inventory for the IRW was flawed because he did not consider the number of birds per house in a separate and distinct analysis of litter produced must fail on its face.

3. Plaintiff claims that “Dr. Clay admitted in his deposition that he erroneously used 2002 annual data for his poultry waste calculations, but purposely reduced that total by other data from 2007.” Dkt. 2061 at 5. Plaintiff provides absolutely no support Dr. Clay’s so-called admission that he erroneously used 2002 annual data. Throughout his deposition, Dr. Clay defends the use of the 2002 Ag Census data. (*See*,

e.g., Ex. B.1: Clay Dep. 118:15-121:2; 123:16-125:16; 169:22-170:15; Ex. B.2: Clay Dep. at 327:6-328:23; 333:6-336:24; 344:19-346:13; 358:22-360:2; 391:10-12; 395:16-396:3.) The deposition testimony cited by Plaintiff relates only to the State's complaint that Dr. Clay presents BMP's reported litter export from the IRW for 2007 in his report. (Ex. A: Report at 17.) BMP's litter export number is reported below Dr. Clay's presentation of the various estimates of dry litter produced in the poultry houses in the IRW. Since litter exported out of the watershed is not available for land application in the watershed, Dr. Clay presents the BMP's number. (Id.)

No one, including Plaintiff, has attempted to measure all of the litter exported from the watershed. BMP's, Inc. tracks its periodic litter exports. Since its inception, the amount of litter exported from the IRW by BMP's has increased. (Ex. G: Sherri Herron Dep. 9/15/08 at 137:2-17.) From his study of the watershed, Dr. Clay knows that litter is being exported by individuals or companies independent of the litter export coordinated by BMP's. (Id.; Ex. B.2: Clay Dep. 369:25-370:20.) Further, he learned from his interviews and study that these litter export practices have been taking place prior to 2007. (Ex. A: Report at 32-33, ## 127-128; Ex. B.1: Clay Dep. at 288:16-23; Ex. B.2.: Clay Dep. 369:25-370:20.) Plaintiff's criticisms are therefore not borne out by either the evidence or the result.

### **III. DR. CLAY'S RELIANCE ON DR. RALEIGH JOBES IS REASONABLE UNDER RULE 702.**

Dr. Clay appropriately collaborated with Dr. Jobes for the statistical calculations that he uses as the basis for his opinions. Although Dr. Clay has worked with agricultural statistics on numerous occasions, he asked Dr. Jobes to collaborate on the statistics in this

case because Dr. Jobes has extensive training and experience in data gathering and interpreting statistics. (Ex. B.2: Clay Dep. at 314:21–315:3.) Dr. Jobes is Professor Emeritus at OSU in agricultural economics and has a doctorate in agricultural economics. (Ex. B.1: Clay Dep. at 84:1-4; Ex. B.2: Clay Dep. at 314:4-14.)

Dr. Clay's collaboration with Dr. Jobes is reasonable because a testifying expert's reliance on the work of another expert is generally considered reliable. See, e.g., United States v. 1,014.16 Acres of Land, 558 F. Supp. 1238, 1242 (W.D. Mo. 1983), aff'd, 739 F.2d 1371 (8<sup>th</sup> Cir. 1984). Under Tenth Circuit law, an expert witness cannot simply assume the conclusions of a non-testifying expert with "no indication of any familiarity with the methods or reasoning used by the" consulting expert "in arriving at his conclusions." TK-7 Corp. v. Barbouti, 993 F.2d 722, 732 (10<sup>th</sup> Cir. 1993). Here, Dr. Clay provided Plaintiff with ample testimony regarding the methodology employed by Dr. Jobes to calculate the animal and manure numbers in his report. (Ex. B.2: Clay Dep. at 356-69.) In contrast to Plaintiff's assertions otherwise, Dr. Clay made the final decision regarding the assumptions that were made and the methodology that was used to determine the animal and manure numbers used in his Report. (See, e.g., Ex. B.2: Clay Dep. at 308:16-24; 327:19-328:10; 394:4-14.)

#### **IV. DR. CLAY'S POULTRY AND CATTLE INVENTORY NUMBERS ARE RELIABLE AND APPROPRIATE.**

##### **A. Cattle vs. Poultry**

Plaintiff unfairly criticizes Dr. Clay for not employing a "one size fits all" formula to determine the numbers of cattle and poultry in the watershed. According to Plaintiff, a single methodology for all cattle and all poultry is somehow more reliable than a

methodology that recognizes the unique characteristics of each. Dkt. 2061 at 4. As shown below, a broad brush approach, if anything, reveals the inadequacies of Plaintiff's own expert testimony on this subject because it disregards the actual differences in their production practices.

Dr. Clay used the data reported from the most recent National Agricultural Statistics Service, Census of Agriculture (2002) to arrive at his numbers for all types of poultry and cattle present in the watershed. (Ex. B.1: Clay Dep. 118:15-18; 161:8-17; 170:3-6.) Contrary to the State's suggestion, he considered both the inventory and sales data for both as reported by the Agricultural Census. He did not ignore either category. (Ex. B.2: Clay Dep. at 347:17-348:7.) Rather, to calculate the animal inventories, he elected to employ the data most appropriate for the production of each type of animal.

Dr. Clay's approach recognizes that cattle are generally present in the watershed all year. Most producers do not sell every head of cattle on their farm every year. Most cattle producers in the IRW replace their cows every eight years. Accordingly, the sales data might capture only  $1/8^{\text{th}}$  of the cows that are actually present in the watershed during the year. Similarly, bulls are typically replaced every four years. The sales data therefore might capture only  $1/4$  of the bulls present in the watershed. Because heifers are raised for two years before replacing a cow the sales data does not capture the replacement heifers. Using only sales data to estimate the total number of cattle in the watershed per year would result in a gross underestimate. (Id. at 347:25-348:7.)

Poultry, in contrast, are not present in the watershed all year. A broiler producer will have on average five separate flocks on his farm per year. The sales data will capture the five separate flocks that are on that farm in one year. The inventory data, on

the other hand, provides only a snapshot of the poultry present on a farm on January 1. Although inappropriate to determine the total number of poultry, the inventory can be used for comparison and confirmation. The sales data for poultry provides specific numbers for different types of poultry: broilers; breeders/layers; and turkeys. (See Ex. H: 2002 Census of Agriculture: Oklahoma and Ex. I: 2002 Census of Agriculture: Arkansas.)

The sales data for cattle provides very little usable information, because you cannot determine the actual type of cattle from the sales data. (Ex. B.2: Clay Dep. 347:25–348:7.) For one thing, sales data reports only the number of cattle under 500 pounds and over 500 pounds. (Ex. J: Census Form, p. 11 of Ex. 40 to Clay Dep.) Cattle generally include bulls, cows, heifers, and calves that vary greatly in size and manure output. For example, a two-year old bull should weigh around 1300 pounds while a mature bull may weigh as much as 1600 pounds. (Ex. K: OSU Factsheet, ANSI-3254.) Heifers may weigh between 600 and 925 pounds. The sales data is not sufficiently detailed enough to distinguish between the 600 pound heifer and the 1500 pound bull.

Thus, contrary to Plaintiff's allegation, Dr. Clay did not ignore any of the data provided by the Agricultural Census. To account for the various cattle sizes, he used the inventory data from the Agricultural Census as the primary basis for determining the total number of beef cows, milk cows, and other cattle and calves. Dr. Clay's methodology is also more reliable than simply using sales data because the sales data does not reflect the total number of cattle present in the watershed in a year. Dr. Clay, based on his extensive experience in animal production, understands the cattle producers' practices and reviewed the sales data for comparison purposes, and therefore, his methodology

provides realistic, real-world data for the jury to consider. (Ex. B.1: Clay Dep. at 118:4-14.)

In contrast, Dr. Clay used the sales data as the primary basis for determining the total number of broilers, turkeys, and breeders and layers in the watershed in a year. Because the inventory data does not reflect the amount of poultry in the watershed over a year, and because Dr. Clay knew how many flocks of various birds are present in the watershed over a year, he considered the inventory data for comparison purposes. Far from being unreliable, Dr. Clay's methodology again provides a realistic estimate of poultry in the IRW.

Plaintiff further attempts to challenge the reliability of Dr. Clay's cattle inventory by claiming that "Dr. Clay admitted in his deposition that cattle might be bought and sold during the year, but he did not use the reliable 2002 Agricultural Census to provide the most accurate data." Dkt. 2061 at 4. However, Plaintiff provides no citation for this supposed "admission." Rather, Dr. Clay explained in his deposition that his cattle inventory numbers actually include cattle that are bought and sold during the year. Those cattle would be captured in the "Other Cattle and calves" category. (Ex. B.2: Clay Dep. at 335:13-22.) As shown above, Plaintiff's allegation that "he did not use the reliable 2002 Agricultural Census to provide the most accurate data" is absolutely false.

Plaintiff also tells the Court that instead of using the Agricultural Census data, Dr. Clay "created a formula for which there is no scientifically accepted authority." Dkt. 2061 at 4. Plaintiff provides no description of the formula allegedly used by Dr. Clay to calculate his cattle numbers. Instead, Plaintiff mistakenly cites deposition testimony in which Dr. Clay describes an entirely different calculation, one in which Dr. Clay used the



Beef Animal Unit to calculate the total amount of wet manure produced by beef cattle in the watershed. See discussion of Dr. Clay's wet manure calculations in Section IV below. The Beef Animal Unit is not used to determine the total number of beef cows in the watershed. Instead, Dr. Clay uses Beef Animal Unit along with his total number of beef cows to determine the amount of wet manure produced by beef cattle in the watershed. Plaintiff's criticism should therefore be disregarded.

Dr. Clay employs his unique expertise and knowledge of poultry and cattle production generally and specific to the IRW to determine numbers of poultry and cattle present in the watershed. As demonstrated above, it is appropriate to use sale data as the primary basis for calculating the number of poultry in the watershed, while the inventory data is more appropriate for the primary basis for calculating the number of cattle.

**B. Dr. Clay employed reliable methodology to determine the inventories in the IRW from the Agricultural Census data reported by zip code.**

The Agricultural Census reports data on a state-wide basis and per zip code. Based on his background in this area, Dr. Clay recognized and understood that if there were zero to four producers in one zip code, the Census Bureau would not release the data specific to that zip code in order to protect those producers' confidentiality. (Ex. B.2: Clay Dep. at 328:20-23; 331:16-20.) Prior to making his calculations, Dr. Clay understood that this Census Bureau reporting protocol could potentially result in an underestimate in his calculations. (Ex. B.2: Clay Dep. at 330:17-331:3.) Accordingly, Dr. Clay's first step was to obtain a gross estimate of the number of identified animals in the watershed using the AG Census zip code data. (Id. at 332:1-3.) Plaintiff incorrectly suggests that Dr. Clay's analysis stopped here.

In reality, Dr. Clay went on to compare his estimate to other reported numbers. Dr. Clay first compared his poultry inventory numbers with the inventory numbers presented by Plaintiff's consultant Meagan Smith. Dr. Clay estimated that the total number of poultry in the watershed in 2002 was 150,660,760. Plaintiff's consultant Meagan Smith estimated 151,781,155 – a difference of approximately one half percent. Dr. Clay's analysis did not stop there. He then used the Ag Census zip code data to calculate an estimate of 603 poultry farms in the Watershed. The State estimates an average of three houses per farm. (OCC, Comprehensive Basin Management Plan 1999 and OCC 2007). Three houses on 603 farms equals 1809 houses in the watershed. The Defendants in this litigation reported 1810 houses. (Ex. A: Report at 16 and Appendix I.) Once again, this comparison confirmed the reliability of Dr. Clay's estimate. (Ex. B.2: Clay Dep. at 341:5-14.)

Plaintiff also criticized Dr. Clay for not using the estimate from Defendants' discovery responses. Dr. Clay, however, understood that Magistrate Judge Joyner required the Integrators in this litigation to produce some estimates of total number of birds grown in the watershed even though the Integrators warned that they do not track numbers of birds raised in the watershed per year. Dkt. 1409, at 3; Dkt. 1279 at 12-13; 11/6/07 hearing transcript, Dkt. 1387 at 133 et seq. Defendants advised Plaintiff and the Court that the numbers they were seeking did not exist in their records. Dkt. 1409 at 3; Dkt. 1279 at 12-13; 11/6/07 hearing transcript, Dkt. 1387 at 133 forward. Pursuant to Court Order, estimates were produced along with an explanation of these estimates. Dkt. 1409 at 3. Despite the Integrators' warnings, Plaintiff relies upon information produced to arrive at an estimated for total poultry in the watershed in 2002 as 145,267,093.

Bernard Engel Report at 12, Ex. 1 to Dkt. 2056. Plaintiff suggests that Dr. Clay should also adopt these numbers notwithstanding the fact that Dr. Clay's estimate is actually 5,393,667 greater.

Finally, Plaintiff disingenuously accuses Dr. Clay of underestimating his poultry inventory by using a map that was untimely produced by Plaintiff for the first time during Dr. Clay's deposition and attached again to their motion in limine. Ex. 5 to Plaintiff's Motion, Dkt. 2061.<sup>3</sup> Plaintiff's new analysis suggests that Steve Butler produced more than 6 million broilers in 2002. But, Dr. Clay was well aware of the Butler Farms and is also aware that all of their litter is transported out of the watershed. (Ex. A: Report at 34, #148; Ex. G: Herron Dep. at 213:5-12.) Accordingly, if Butler's production numbers are not actually reported in the zip code census data, there could be no actual effect on Dr. Clay's analysis.

**V. DR. CLAY'S CALCULATIONS FROM TOTAL NUMBERS OF ANIMALS IN THE WATERSHED TO WET MANURE PRODUCED ARE RELIABLE AND APPROPRIATE.**

Plaintiff baldly claims that Dr. Clay manufactured numbers by taking the "scientifically acceptable" census data and adding thirty percent. Dkt. 2061 at 4. Plaintiff either fails to understand the proper use of an Animal Unit or intentionally misrepresents what it is.

An Animal Unit is a standard reference number used to compare different types of animals. (Ex. B.2: Clay Dep. at 316:20-317:10; see also Ex. L: Meagan Smith Report at 11.) 1000 pounds of animal weight is a standard animal unit. Id.; Chapter 4, Agricultural Waste Characteristics, Dkt. 2061-4, Ex. 3; and ASAE, Manure Production

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<sup>3</sup> Pursuant to the Court's clear orders, Dkt. Nos. 1839, 1842 and 1989, Defendants object to any further use of this map.

and Characteristics, Dkt. 2061-5, Ex. 4. For example, if a producer wants to maintain 100 cows, he must also maintain replacements heifers, and a bull. Normally, one bull will service 25 cows. Cows are generally replaced every eight years by heifers who have reached the age of two years old. To estimate the feed that he needs for 100 cows, the producer must also consider his supporting units: the replacement heifers and the bulls. Accordingly, the Beef Animal Unit is comprised of the cow,  $1/25$  of a bull,  $1/8$  of a heifer that is over one year old, and  $1/2$  of  $1/8$  of a heifer that is between the age of six months and one year. (Ex. A: Report, Appendix C, Table C-2; Ex. B.2: Clay Dep. 334:13–18; 336:1-7; 343:5-24.)

Dr. Clay did not add numbers to the census data. (Ex. B.2: Depo. at 335:13–25.) He simply allocated the reported census numbers to the appropriate Animal Unit. Then, he could use his Animal Units to calculate the amount of wet manure produced by cattle in the watershed. (*Id.* at 334:13–18; 336:1-7.) Rather than including additional numbers, Dr. Clay does not use the number of calves in the watershed for his wet manure calculations to ensure a conservative estimate. (*Id.* at 345:13–346:2.)

To supposedly buttress its criticism of Dr. Clay, Plaintiff makes the easily disprovable assertion that “Dr. Clay counted bulls and heifers more than once to change his animal unit for cattle from 1 to 1.3 while admitting those animals are already accounted for in the census data.” Dkt. 2061 at 4. The record speaks for itself. The deposition testimony reveals no such admission. In reality, Dr. Clay testified that he did not add numbers to the census data. (Ex. B.2: Clay Dep. at 335:23 -25; 316:20–317:10.)

Dr. Clay also employed Animal Units for poultry and other animals. (Ex. A: Report, Appendix C, Table C-2.) The average weight of the animal is used to calculate

the animal unit. Dr. Clay used the standard reference for the average weight for broilers present in the watershed of 2.25 pounds. (See Ex. M: Natural Resource, Agriculture, and Engineering Service (NRAES), Poultry Waste Management Handbook, September, 1999 at 9, Clay000078.) While Plaintiff criticizes Dr. Clay for using an average weight that is too low resulting in an underestimate of the amount of manure produced, Plaintiff fails to tell the Court that the Oklahoma Conservation Commission's "Comprehensive Basin Management Plan" employs the average weight that is even lower than Dr. Clay's, *i.e.*, two pounds for broilers.<sup>4</sup> The average weight for broilers used by Plaintiff's own consultant Meagan Smith was 2.5. (Ex. N: Meagan Smith Dep. 9/10/08 at 134:14–135:19.) Rather than using a reference standard from the literature, Ms. Smith does her own calculation. She estimates that broilers are on average five pounds when they are sold. To obtain the average weight of broilers, Ms. Smith merely took her five pound estimate and divided by two. (Id.)<sup>5</sup>

Finally, Plaintiff misrepresents to this Court that Defendants' documents provide an average weight for broilers and criticize Dr. Clay for not using these documents:

Additionally Dr. Clay used an average weight for broilers that was less than that reported by Defendants in documents produced in this case and by several growers in their deposition, all of whom reported average bird weights in excess of the amount used by Dr. Clay.

Dkt. 2061 at 5. Plaintiff provides absolutely no support for this criticism. Plaintiff fails to identify any deposition testimony from growers supporting this statement. Plaintiff

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<sup>4</sup> Average number of broiler flocks per year is identical to Comprehensive Basin Management Plan also.

<sup>5</sup> The State challenges Dr. Clay's qualifications to methodologies, but rely upon an engineer-in-training, Meagan Smith little or no experience in agronomy or veterinarian medicine or toxicology. (Ex. N: Smith Dep. at 221:8-22; 18:15-19:2.) Rather than using a standard from the published literature, Ms. Smith calculates her own average broiler weight. (Id. at 134:14–135:19).

only generally refers these elusive “documents,” but does not provide any examples. If Plaintiff had attached the document discussed in Dr. Clay’s deposition, the Court could see the variation in the weight of broilers reported and the fact that no average weight is provided in the document itself as Plaintiff suggests. (Ex. O: Ex. 6 to Clay Dep.)

Plaintiff’s criticism of Dr. Clay’s wet manure numbers is simply unfounded. Dr. Clay used data to calculate wet manure data that is not only reliable but compares favorably to the data used by Plaintiff. Accordingly, Plaintiff’s Motion should be denied.

**VI. DR. CLAY’S CALCULATIONS FROM TOTAL WET MANURE PRODUCED TO MANURE DEPOSITED OR AVAILABLE FOR APPLICATION TO LAND IN IRW ARE RELIABLE AND APPROPRIATE.**

Plaintiff misrepresents the methodology employed by Dr. Clay to calculate the total manure deposited or available for application in the IRW. Plaintiff suggests that Dr. Clay creates a fictional process that transforms wet poultry manure to dry litter while it is in the poultry house. Dkt. 2061 at 6. The truth is that every poultry producer and veterinarian understands that poultry litter must go through a drying or fermentation process in the poultry house.<sup>6</sup> (Ex. B.1: Clay Dep. at 261:13–21; see Ex. M: Poultry Handbook at 5-6.) The authoritative literature recognizes this process. (See Ex. M: Poultry Waste Handbook at 5-6; Ex. B.1: Clay Dep. at 262:11-18, 67:12-22.) See also Agricultural Waste Management Field Handbook, Chapter 4, Ex. 3 to Dkt. 2061. Plaintiff criticizes Dr. Clay for making appropriate adjustments to account for the drying process.

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<sup>6</sup> Plaintiff’s complaint seems to be with the term “fermentation.” As Dr. Clay explained in his deposition, he is merely describing the drying process that wet manure undergoes when it is combined with poultry litter and remains in the poultry house. (Ex. B.1: Clay Dep. at 260:22–261:3; 261:22–262:1.)

All organic material when placed in the environment undergoes microbial degradation. (Ex. A: Report at 13 citing the Agriculture Waste Management Handbook.) In the case of poultry manure that comes in contact with the rice hulls or bedding in the poultry house, the microorganisms that are excreted from the bird quickly consume the available carbohydrates releasing ammonia and CO<sub>2</sub> into the atmosphere. (Ex. B.1: Clay Dep. at 262:11-23.) Too much ammonia in the poultry house can be toxic to the birds. So, the producer must dry the litter as quickly as possible using temperature and ventilation. Manure when produced by the birds contains approximately 75% moisture. Agricultural Waste Management Field Handbook, Chapter 4, Dkt 2061, Exhibit 3 at Clay000150, Table 4-14. After the wet manure combines with the bedding materials, producers aim to maintain litter moisture at 20–25%. (Ex. M: Poultry Waste Handbook at 6; Ex. A: Report at 13.) Poultry producers and veterinarians understand this process and the importance of managing these microbial processes in the poultry house by drying the litter as it is critical to bird health. (Ex. M: Poultry Waste Handbook at 5-6.)

Dr. Clay presents the available estimates for annual litter production in the IRW. All of these estimates take into consideration the drying process that poultry manure undergoes when it combines with the bedding materials and is maintained in the poultry house for a period of time.

Engel/Fisher	354,000 <sup>7</sup>
Storm	231,000 <sup>8</sup>
Herron/Clay	307,700
NRAES-132/Clay	312,033 (Poultry Waste Management Handbook)
Clay 2002 Census Data	295,114

<sup>7</sup> Ex. P: Fisher Report at 23–24.

<sup>8</sup> Ex. Q: Storm, Illinois River Upland and In-Stream Phosphorus Modeling, Final Report, June 28, 2006 at 13; (Ex. B.2: Clay Dep. at 398:12–399:22.)

Sheri Herron is the executive director of BMP's, Inc. which is the non-profit organization that arranges for poultry litter to be transported out of the watershed. (Ex. G: Herron Dep. 81:11-21 and Ex. H thereto.) Defendants report that there are 1810 poultry houses in the watershed. (Ex. A: Report at 16 and Appendix I.) She estimates that approximately 190 tons of litter, including de-caked material, will be harvested from one house. (Ex. A: Report at 16 and Appendix I.) This number represents the estimate of litter that is cleaned out of the house after it has undergone the drying process. (Id.)

The NRAES-132/Clay method refers to the Poultry Waste Management Handbook which provides an estimate of litter produced per 1000 pounds of various types of poultry, including broilers, breeders, and turkeys. (Ex. M: Poultry Waste Handbook at 8-9.) The Handbook's formula is used to determine "[t]ypical litter production, as removed from production houses." (Id. at 9, Table 1-6.) Since drying and microbial degradation take place before litter is removed from the house, Dr. Clay did not add another calculation to the Poultry Waste Management Handbook estimates to account for drying as Plaintiff suggests. (Ex. B.2: Clay Dep. at 356:22-25; 362:24–363:20.)

The Clay 2002 Census Data method uses the Ag Census data to determine the amount of produced manure on a house basis. (Ex. A: Report at Appendix A-S1, at 5; Ex. B.2: Clay Dep. 360:4–361:10; 362: 24 – 363:20; Ex. R: Ex. 45 to Clay Dep.) Fresh manure as produced has a moisture content of approximately 75%. So, Dr. Clay made the necessary adjustments to reflect the moisture content of the litter when harvested from the house after drying, approximately 24% for broilers. Id.



This drying concept is so basic and universally understood that Plaintiff's only method of attack is to confuse and obfuscate as shown below:

Dr. Clay agreed this "fermenting" or drying process that he attempted to calculate is already accounted for in the reliable data available in the Agricultural Handbook. However, rather than using the data available from the Agricultural Handbook, Dr. Clay chose to use his own, untested, unreliable "fermentation" methodology to address the manner in which poultry waste dries.

and

Dr. Clay ignores reliable data available to him in recognized, authoritative materials regarding poultry manure and waste characteristics, and instead performs a complicated calculation to further 'dry' the poultry waste, thus reducing its weight and the amount of poultry waste contribution to the IRW.

Dkt. 2061 at 6.

Although Dr. Clay agrees that the Handbook recognizes and accounts for the fermentation or drying process, he did not make any additional adjustments for drying using the Handbook formula. The Handbook formula is a formula for determining dry litter, *i.e.* 24% for broilers. In a separate calculation using the census data, Dr. Clay determines the amount of wet manure produced, *i.e.* 75% moisture. Dr. Clay uses a simple calculation to determine the amount of dry litter, *i.e.* 24% moisture for broilers, from the wet manure number. (Ex. A: Report Appendix A-S1 at 5; Ex. B.1: Clay Dep. 356:22-25; 360:4-361:10; 362:24-363:20; Ex. R: Ex. 45 to Clay Dep.)

#### **VII. DR. CLAY IS QUALIFIED TO CRITICIZE DRS. ENGEL/SMITH'S SO-CALLED MASS BALANCE TESTIMONY.**

Plaintiff seeks to exclude Dr. Clay's criticisms of Plaintiff's experts' self-described "mass balance" for phosphorus in the IRW because Dr. Clay allegedly stated that "he does not have qualifications to opine about mass balance studies." Dkt. 2061 at

3. Once again, Plaintiff's mischaracterization of Dr. Clay's testimony and opinions is a red herring that has little to do with Dr. Clay's proposed expert testimony.

Plaintiff's consultant Meagan Smith prepared what they refer to as a mass balance for phosphorous in the IRW. A mass balance study by definition is an accounting of all inputs and outputs. (Ex. N: Smith Dep. at 33:4-9.) Dr. Clay criticizes Smith's work because the so-called mass balance does not account for all inputs and outputs. Specifically, Smith does not account for livestock products sold other than beef calves and all crops of produce sold. (See Report at 15; Ex. B.2: Clay Dep. at 385:24-386:7.) Dr. Clay states that his opinion is based upon what he has read regarding the required components of mass balance. (Ex. B.2: Clay Dep. at 386:17-18.) Although Plaintiff did not ask for the specific materials he read, Dr. Clay cites several communications and materials as the source of knowledge. (Ex. F: Clay Aff. at ¶ 6 and Ex. B thereto.) He also bases his criticisms of Plaintiff's "mass balance" on his personal experience and involvement in the business. (Ex. B.2: Clay Dep. at 386:24-25.) Such reliance is sufficient under Tenth Circuit law to allow Dr. Clay to testify regarding his criticisms. See, e.g., Smith v. Intersoll-Rand Co., 214 F.3d 1235, 1245-46 (10<sup>th</sup> Cir. 2000) (engineers may testify in products liability case regarding a defective milling machine even though both lacked first-hand knowledge). Accordingly, Dr. Clay's testimony about Plaintiff's "mass balance" is admissible.

### **VIII. CONCLUSION**

As a veterinarian, agronomist, and veterinary toxicologist, Dr. Clay is uniquely qualified to offer opinions concerning animal production in the IRW. His methodologies are reliable and appropriate. His testimony will be helpful to the trier of fact. For all of

Dated: June 5, 2009

Respectfully submitted,

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